

Public trust and vaccine acceptance-international perspectives

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Vaccines save millions of lives every year. They are one of the safest and most effective public health interventions in keeping populations healthy while bringing numerous social and economic benefits. Vaccines play an important role in ensuring that children, regardless of where they live, can have a healthy start to life. New financing mechanisms that allow poorer countries to gain access to vaccines faster than ever mean additional deaths and disabilities are projected to be saved during the Decade of Vaccines (2011–2020). Trust in vaccines and in the health system is an important element of public health programs that aim to deliver life-saving vaccines. Indeed, understanding the contributors and threats to trust is essential to explaining vaccine acceptance, particularly as they vary across epidemiologic conditions, specific vaccines and cultural and sociopolitical settings. Greater efforts to communicate the benefits and risks of vaccines and address issues with evidence-based information will help improve and sustain public trust in vaccines and health systems worldwide. Measuring and monitoring trust levels and focusing on deliberate efforts to build trust in vaccines are important steps to reducing vaccine confidence gaps when they occur.

Background

Globally, coverage of routine immunization is relatively high. For example, 83% of the world's infants receive three doses of the diphtheria-tetanus-pertussis vaccine (DTP3) every year.¹ This means the majority of parents value vaccines and indeed have their children vaccinated. For those children who do not get vaccinated, it is often due to lack of awareness, limited access to care, supply side issues such as vaccine stock outs or a poorly performing health system that is unable to deliver vaccines reliably. However, lack of trust in vaccines and in the health system is also an important barrier in some settings, preventing children from receiving life-saving immunizations. It is essential that parents, healthcare practitioners, public health professionals and policy makers recognize the value of vaccinating children to both individuals and communities.

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Vaccine Confidence Gap

Individuals and communities experience the profound benefits of disease prevention from immunization differently depending on the disease in question, the vaccine and the stage of the vaccine program. Paradoxically, some of the greatest vaccine achievements are increasingly difficult for individuals to value because of the very success of immunization programs. For example, few parents, physicians or other health practitioners living in communities with strong routine immunization programs and low child mortality have ever seen a case of polio, tetanus or even measles. As vaccine programs mature and eventually reach their ultimate goal of disease elimination or eradication, the ability of individuals to directly value the benefits of vaccination may diminish. Just as the absence of a disease outbreak does not make headline news, we rarely hear about the thousands of deaths and disabilities that did not occur each year because they were avoided through immunization programs. For some parents or other decision makers in low disease settings, the risk of vaccination may appear higher than that of a vaccine preventable disease. However, these diseases still occur and cause disability and death where vaccination programs are not able to reach every child.

Particularly in low disease settings, there may be a divide between health practitioners who generally believe in vaccines and some parents who may not. Doctors, nurses and other health workers learn about how vaccines work and the benefit-risk profile in their training. Some may even remember the effects of vaccines in real time when the number of ill patients they care for noticeably declined after the introduction of a new vaccine. Even if they do not see patients with vaccine-preventable diseases, their awareness may influence the perceived risk of disease in certain populations.

Parents and other decision makers, on the other hand, may not be familiar with the diseases vaccines prevent, making it difficult to appreciate the benefit of prevention from immunization. Vaccination is one of the first medical decisions parents make on behalf of their newborns. All parents want the best for their children; but it can be hard to understand how vaccines work and uncomfortable to inject a healthy baby. Although the health practitioner may provide information about vaccine efficacy and safety, for some this is not enough to understand the full benefits of vaccines for the child and the population as a whole. Although less common, there are also a small number of healthcare practitioners who may be vaccine hesitant and may communicate this

aversion to parents. Such mixed messages from healthcare providers may add to people's confusion around vaccines.

In both low and high disease settings, parents and decision makers may not have access to enough trustworthy information about the value of vaccines to be comfortable with them, may not trust vaccines perhaps for philosophic or religious reasons or may simply be fearful because of what they have heard. In some communities, parents may have been fed misinformation by leaders or heard more about the risks of vaccines than the diseases they prevent. All too frequently, media, social networks or non-medical groups communicate unsubstantiated claims about alleged risks of vaccines. For parents and decision makers in settings where these diseases still take their toll on the lives and health of children, misinformation about vaccines can fracture fragile health systems and stall immunization programs. Yet simply providing truthful information about vaccines may not be enough. The mode of communication, content of message, impact of conflicting information from various sources and trust in the information source are all likely to play a role in how certain information (or misinformation) about vaccines is trusted and spread.

Trust in Vaccines

Public concerns about vaccines are not new. During the first mandated smallpox vaccination campaign in the 1800s, there were anti-vaccination groups concerned about vaccine safety, dosing schedules and policies. Many of the same basic concerns about the risk of adverse events, weak public health institutions and the business motives of the vaccine industry remain today. What has changed is the growing diversity of vaccines, the rapid speed in which information spreads globally and the increased ease of organizing through the internet and social media.² The growing number of vaccines has been met with an increased number of developing country vaccine manufacturers, various vaccine combinations and formulations and different vaccination schedules across countries. Adding to this complexity is the growing amount of non-validated information on vaccines from non-medical sources, virtual community groups for and against vaccination and the difficulty of assessing information sources. For example, social media such as Twitter, Facebook, internet forums, blogs and wikis have increased access to many sources of vaccine information, including those not endorsed by scientific evidence. It is no surprise that in this complex context, conflicting information and confusion may fuel skepticism and mistrust in some communities, especially when access to credible sources of information is limited.

Misinformation can profoundly threaten sound vaccination programs. For example, it has taken over a decade of time, effort and money to generate the evidence to dispel the possible link between the measles, mumps and rubella (MMR) vaccine and autism from a study widely discredited on scientific grounds. Multiple studies of both the MMR vaccine and of thimerosal, an ethylmercury-containing preservative used in some vaccines, have found no causal association with the development of autism.³⁻⁸ These studies included hundreds of thousands of children, occurred in multiple countries, were conducted by multiple

investigators and were well controlled. While hypothetical relationships between vaccines and other illnesses such as asthma, diabetes, multiple sclerosis and SIDS have been investigated by a variety of expert groups, no studies have reliably established a causal link between vaccines and these diseases.

While vaccines are supported by the majority of the public, the vaccine confidence gap is a global phenomenon that affects high-income countries and low- and middle-income countries alike. The concerns may vary by vaccine and often manifest themselves differently in each country. For example, concern over vaccines' links with autism caused the suspension of Hepatitis B vaccine in France in 1998⁹ and dropped the coverage for MMR vaccine notably in France, the United Kingdom¹⁰ and in the United States,¹¹ even though scientific evidence to support this link was never found.¹² In some cases, vaccines have been suspended due to concerns about contamination or illness only to be reinstated once the investigation was complete.¹³ The press has at times reported deaths associated with time of vaccination, but not the results of investigations into the cause of death, which frequently have been shown to be the result of another condition.¹³ Many vaccine suspensions and boycotts are not based on scientific evidence but often spurred by this type of misinformation. Fear of sterilization accompanied a drop in tetanus vaccination coverage in the Philippines, Nicaragua and Mexico in 1994,¹⁴ as well as spurred the boycott of the oral polio vaccine in northern Nigeria in 2003¹⁵⁻¹⁹ and stalled polio eradication efforts in India.¹⁸ Beyond concerns for vaccine safety, vaccine programs also face threats due to political issues. In Pakistan, polio vaccination workers were assassinated in 2012 and 2013 although the use of vaccination schemes to reach political objectives has been condemned by the public health community.^{20,21}

Parents' decisions to vaccinate their child often involve a mix of psychological, sociocultural and political factors in addition to scientific and economic evidence.² In the Netherlands, higher levels of intention to receive vaccination for H1N1 pandemic were associated with greater trust in government, fear/worry and perceived vulnerability to the disease.²² In the Democratic Republic of the Congo, deeply entrenched religious and traditional beliefs as well as a strong distrust of government health services have undermined some of the polio eradication efforts where child absenteeism often conceals vaccine avoidance behavior.²³ In certain pockets of Nigeria, reasons for opposition to vaccines by mothers and/or fathers include rumors about vaccine safety, community suspicions about motives behind immunization promotion and pre-existing political, religious and ethnic tensions.²⁴ In order to reach more children with life-saving vaccines, communication about vaccines needs to take into account the specific social, cultural and political contexts of each country.

Vaccine Benefits

One of the concerns about vaccines is risk of acute adverse events. It is indeed true that all vaccines have possible side effects; however, most side effects are mild, such as fever or tenderness and swelling where the immunization is given. Rarely, more severe side effects do occur, but they are almost universally transient.

Unfortunately, choosing to avoid vaccination can place a child at an even greater risk for contracting a potentially deadly disease than that of a rare side effect. Within a community, low vaccine use can mean more hospitalizations, disabled children and deaths from diseases that were preventable. The vaccination decision affects not only the health of the child, but also the health of the family and the community. These considerations are all too often not part of the full assessment of risk and benefit of vaccine programs. Considering the risk of vaccines and the risk of diseases, vaccines are the safer choice.

Vaccines are highly effective and efficient in reducing illnesses, deaths and disabilities. One of the most compelling success stories of vaccines is the eradication of smallpox, a debilitating disease that caused over 300 million deaths during the 20th century (more than twice the death toll of all the military wars in the same period).²⁵ We have also seen that increased access to vaccines in developing countries can drastically reduce illnesses and death. For example, measles-related mortality in children dropped by 86% between 1990 and 2008 due to expanded use of the measles vaccine globally.²⁶ Such declines in mortality are important to remember to help build trust in vaccines. In addition, it is not only vital that families recognize the individual benefits of vaccines, but also the broader communal benefits. In this decade, expanding the delivery of six life-saving vaccines against pneumococcal disease, *Haemophilus influenzae* type b (Hib), rotavirus, pertussis, measles and malaria (projected first use in 2015) in 72 low- and middle-income countries could save 6.4 million lives, avoid 426 million cases of illness and prevent 63,000 children from being disabled.²⁷

Furthermore, the economic impact of vaccines to the family can also be very compelling. Vaccines are not only life-saving, but they are also a smart economic investment. For a few dollars per child, vaccines can prevent disease and disabilities that last a lifetime, saving millions of dollars in potential healthcare spending. Families freed from the crippling costs of medical care for vaccine preventable diseases can instead spend more on food and education. Between 2011 and 2020, increased rates of vaccination against the six aforementioned vaccines in 72 of the poorest countries could save \$6.2 billion (uncertainty range: \$4.8–9.2 billion) in treatment costs and \$145 billion (\$130–175 billion) in productivity losses.²⁷ To reduce the risk of 6.4 million deaths, people in those 72 countries would be willing to trade off incomes totaling \$231 billion (\$116–614 billion), a real measure of the value communities place on vaccines.²⁸ Systematic reviews of the vaccine economics literature suggest that vaccines are cost-effective by World Health Organization and World Bank standards in most settings.²⁹

Vaccines also bring many societal benefits. By preventing illness, they give children positive long-term educational, social and economic benefits. Specifically, healthy children can attend school regularly, are better able to learn, and are more productive as adults compared with non-vaccinated children.³⁰ For example, in South Africa, for every six children who received the measles vaccine, school grade attainment increased by one year.³¹ In Bangladesh, childhood measles vaccination reduced socioeconomic inequity in health.³² In the Philippines, full childhood

vaccination against measles, polio, tuberculosis, diphtheria, pertussis and tetanus significantly increased cognitive test scores.³³ As a result of these proven childhood benefits, vaccines may increase life expectancy and lifetime earnings when vaccinated children enter the workforce.³⁰ Finally, protection from disease and the corresponding benefits can be extended to those in the population who are not vaccinated through “herd immunity” effects. For example, vaccines against meningococcal, pneumococcal and Hib disease are especially effective in protecting unvaccinated age cohorts or high risk groups against disease.³⁴

The number of diseases for which we have vaccines is growing at an ever increasing rate and new financing mechanisms such as advance market commitments and co-financing policies are allowing poor countries to gain access to these vaccines faster than ever.³⁵ Because of its high cost-effectiveness, immunization has been seen as a primary tool to achieve Millennium Development Goal number four to reduce child mortality by two-thirds between 1990 and 2015. Since its launch in 2000, the GAVI Alliance (formerly the Global Alliance for Vaccines and Immunization) has helped developing countries immunize 370 million additional children and prevent more than 5.5 million future deaths from hepatitis B, Hib, measles, pertussis, pneumococcal disease, polio, rotavirus diarrhea and yellow fever, through subsidizing expensive vaccines and supporting health system strengthening in the poorest countries in the world.³⁶ This decade (2011–2020) was labeled “the Decade of Vaccines” when the Bill and Melinda Gates Foundation committed \$10 billion in 2010 to help discover, develop and deliver vaccines to people in the world’s poorest countries. Many other agencies such as the World Health Organization (WHO), UNICEF and country governments have joined forces to make this a reality. The Decade of Vaccines Collaboration brought together diverse stakeholders to develop a Global Vaccine Action Plan (GVAP), recognizing the importance of vaccines for global health and development. The GVAP, which serves as a roadmap for the future of vaccines, was approved during the World Health Assembly by 194 Member States in May 2012. While these organizations and policies were put in place primarily to support the supply of vaccines, it is time to work on improving demand by building trust and an increased understanding of the value of vaccines at the individual level.

Recommendations

Greater awareness of the value of vaccines among parents, health practitioners, community leaders, policy makers and the media is necessary to build trust in vaccines and in the health system. Health practitioners and community leaders play an important role in proactively building awareness and addressing concerns from parents. For example, studies have found that mothers want additional knowledge regarding the risks and benefits of vaccines during prenatal care in the US.³⁷ Others have identified the importance of trust in the doctors and the government, especially among parents who have previously delayed or refused vaccines in the UK.³⁸ When new vaccines are introduced, it is essential to empower health practitioners about the susceptibility

and severity of preventable diseases, and about vaccine safety and efficacy, as seen in India.³⁹

However, for some governments to increase public confidence in their vaccine system, providing evidence about the safety of vaccines may not be enough. Interventions to enhance positive population-wide beliefs and behaviors concerning vaccination may also be needed,⁴⁰ particularly to enhance routine immunization programs. There has been some success with immunization catch-up campaigns. One example is a successful grass roots mobilization campaign in Nigeria that actively engaged political, traditional and religious leaders to participate in the vaccination campaign by showing road side films on polio from mobile vans in communities.⁴¹ Such successful interventions need to be replicated and sustained for longer periods of time, engaging all stakeholders in the development and dissemination of effective messages around vaccines. Community engagement in these interventions can also help foster partnerships between those who develop and implement immunization programs and those who influence community beliefs.

In addition, there is another role for the media, community leaders and policy makers to play in ensuring that immunization messages are balanced and transparent about risks and benefits. Promoting clarity and full disclosure about risks, uncertainty, and benefits associated with vaccines may address some public concern. Media briefings about infectious disease may prove helpful as many reporters do not have a background in health. Health providers must also carefully consider the psychological, sociocultural and political factors affecting the demand for vaccines. Because of the multi-faceted nature of vaccination decisions, it is also vital to look beyond vaccines to building trust in the health system.

Greater research is essential to increase and sustain the demand for vaccination.⁴² In addition to identifying and evaluating interventions that build trust, it is important to develop better measurements of trust. In a recent review, 45 measures of trust for the health system were identified, but no measures were found for trust in vaccines.⁴³ The vaccine confidence project⁴⁴ is one example of research monitoring public concerns around vaccines through an information surveillance system. Measurement of trust in vaccines could identify population subgroups where trust is low, or discover changes in trust over time. Greater

development and use of trust measures in the health system and for vaccines could improve monitoring and evaluation efforts, which may in turn result in better health outcomes. Measures to monitor and quantify impact are important to show governments the magnitude of the issue for resource allocation decisions.

Conclusion

Worldwide, more than 22 million children miss out on life-saving vaccines every year. Every 20 seconds a child dies from a vaccine-preventable disease. Of the 6.9 million child deaths that occurred in 2011, approximately 15–20% were from vaccine-preventable diseases.⁴⁵ While there are many hurdles to vaccinating the remaining 22 million children, lack of trust in vaccines is an important barrier in some populations. Despite unprecedented investments in vaccine development and distribution, a vaccine confidence gap is emerging in some settings due to the growing complexity of immunization schedules and rapid spread of information (and misinformation). To address this gap, we must build public trust by engaging all stakeholders including parents, health practitioners, community leaders, policy makers, and the media, to recognize the value of vaccines within unique social, cultural and political contexts. Information should be transparent in presenting both the risks and benefits of vaccines and assuring the public that vaccines are safe and effective. People's trust in the information source, mode of communication and consistency of messages should be carefully considered in communication about vaccines. Building and sustaining trust, as well as measuring and monitoring levels of trust, may hold the key to bridging the vaccine confidence gap.

Disclosure of Potential Conflicts of Interest

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